FEDERAL FACILITY NON COMPLIANCE WITH NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMITS: A CASE STUDY OF THE NAVAL TORPEDO STATION, KEYPORT, WASHINGTON

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Federal Facility Non Compliance with National Pollutant Discharge Elimination System Permits: A Case Study of the Naval Torpedo Station, Keyport, Washington

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INTRODUCTION

On December 2, 1970 the United States Environmental Protection Agency (EPA) was established in the executive branch as an independent agency, thus bringing together in a single agency the major Federal environmental control programs.

The Agency's mission is to control and abate pollution in the basic areas of air, water, solid waste, pesticides, noise and radiation. While some of EPA's authority was contained in the original Presidential Executive Order, Congress has subsequently increased this authority with the Clean Air Amendment and the Resources Recovery Act in 1970; the Federal Water Pollution Control Act Amendments, the Federal Environmental Pesticide Control Act, the Noise Control Act, and the Marine Protection, Research and Sanctuaries Act—all in 1972; and the Safe Drinking Water Act in 1974.

The Federal Water Pollution Control Act Amendments of 1972 created the National Pollutant Discharge Elimination System (NPDES) which requires that all dischargers of pollutants to surface waters apply for a permit. This permit is not a license to pollute. On the contrary, a permit regulates what may be discharged, and how much. It sets specific limits on the effluent from each source. It

commits the discharger to comply with all applicable provisions of the 1972 law. If the discharger cannot comply immediately, the permit sets firm targets. The commitments are legally enforceable.

An NPDES permit, in essence, is a contract between a discharger and the United States Government. If a discharger violates the conditions of a permit, or makes illegal discharges without a permit, he may be fined up to $50,000 a day and be sentenced to a prison term. The EPA can require compliance with permit conditions by issuing administrative orders, that are enforceable in Federal court, or by seeking court action.

Executive Order 11752 requires that all facilities owned by, or leased to, the Federal Government must be designed, operated, maintained and monitored to conform to applicable air, water, and noise standards established by Federal, state and local authorities.

In accordance with this Executive Order, the United States Navy issued OPNAV Instruction 6240.3D of 24 April 1975. This Instruction states that the Navy will actively participate in a program to protect and enhance the quality of the environment, through adherence to all applicable regulatory standards, and by initiating actions to conserve natural resources, protect historical and cultural properties and prevent or control pollution caused by Navy facilities.

It also states that Navy shore activities and forces afloat, as appropriate, will cooperate with Federal, state and local environmental protection organizations and comply with the official substantive standards and criteria promulgated by such agencies.[1]

As stated before, the Environmental Protection Agency can force compliance by issuing administrative orders which are enforceable through court actions. However, the question of enforcement and the manner of enforcement becomes vague and questionable when applied to the Federal Government itself. It is not possible for one governmental agency to sue another, nor is it practical for an agency to levy fines against a sister agency.

This question of compliance and manner of enforcing compliance when applied to a Federal facility was raised locally when the EPA cited the U.S. Naval Torpedo Station, Keyport, Washington for violations concerning its NPDES permit.

The following chapters will provide a chronology of events leading up to the citation and the resulting problems, an analysis of those events and the importance played in the ensuing relationships, and lastly provide some

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[1]U.S. Navy, OPNAV INSTRUCTION 6240.3D (Department of the Navy, Office of the Chief of Naval Operations, April 1975), pp. 1-2.

suggestions to avoid conflicts of this nature in the future.

It must be emphasized from the very beginning that it is not the intent of this study to investigate the causes for the citation itself, nor to pass judgement, but rather to look at the relations which transpired between the Navy and the EPA because of the citation. In essence the citation provided the means for a look at the problems which exist when the question of compliance is applied to a Federal facility.

CHAPTER 1

INVESTIGATIVE METHODS

Although the problem applies to all federal facilities, it was decided to concentrate on the Navy and use the U.S. Naval Torpedo Station as a case study for several reasons. One reason was that there was a time constraint. Secondly it was felt that a subject which involved the Navy would provide a distinct advantage in that my status as an active duty officer could open avenues which might otherwise be closed.

The first step in finding a solution was to become familiar with the incident involving the Torpedo Station. The EPA made available all files concerning the incident and any other information that was needed. From these files it was possible to establish a chronology of events which is presented in the next chapter.

From the review of these files it was possible to compile a list of key personnel which were either directly or indirectly involved in the incident. Interviews were scheduled with each of these people. The first interview was scheduled with the Executive Officer of the U.S. Naval Torpedo Station at Keyport, Washington and took place on 14 June 1976. The next day an interview with the Public Works Officer at the Naval Station was held.

Following these were interviews with the Naval Facilities Engineering Command's Environmental Coordinator on 7 July and the Assistant Public Works Officer at Keyport on 19 August 1976. Throughout this period almost daily talks were held with the EPA's Section Chief of the Permit Branch.

It is felt that being in the Navy was particularly useful because those interviews held with naval personnel would not have been as candid and honest as they were. Also once it was explained that there was no interest in the causes for the permit citation but rather in the problems that arose when the EPA and the Navy tried to resolve the citation, tensions eased.

The last interview was held with the Department of the Defense's Liaison Officer to the Office of Federal Activities in Washington, D.C. It was to this office that the problem was finally forwarded when all local efforts failed.

From these interviews a general pattern of thought evolved. This pattern was expanded and refined by reviewing newspaper stories and correspondence held in the files.

Once it was determined that these areas of concern were at the root of the problem, work proceeded towards finding a common solution that would be acceptable to both parties. My knowledge of the Navy system and how it works were used to arrive at the proposed solution.

Once the proposed solution was decided upon, talks were again held with both EPA and naval personnel to get

their opinions and thoughts as to the feasibility and effectiveness of the proposed solution.

CHAPTER 2

CHRONOLOGY OF EVENTS

Since all federal facilities are required to conform to applicable air, water and noise standards established by federal, state and local authorities, guidelines were drafted by the U.S. Environmental Protection Agency outlining procedures to be used concerning compliance enforcement if these facilities were found to be in violation. These guidelines were tested in a confrontation between the EPA and the Navy.

The incident, however, began when a commercial oyster hatchery experienced unusually high mortality rates of its oyster larve. Sea Farms, Inc. had suffered mortality rates as high as 98 percent. Because of the losses, they contracted with a chemical laboratory to sample and test the water coming into the hatchery for possible causes of the deaths. The results indicated high concentrations of mercury. Based upon these results, Sea Farms, Inc. asked the EPA on August 14, 1975 to investigate the situation and provide some guidance.

Pursuant to this request, the EPA on August 25th commenced an investigation of the waters in and around Liberty Bay on which the hatchery was located. As part of this detailed investigation, the U.S. Naval Torpedo Station,

Keyport, Washington was given a compliance monitoring inspection from September 15 to September 18th since it discharged pollutants to Liberty Bay from its waste treatment plant.

This was not the first inspection the Naval Station had received since being issued its NPDES permit in 1973. In fact it had undergone an inspection three months earlier by representatives of the EPA and the Washington Department of Ecology. The results of this earlier inspection indicated everything was satisfactory. It must be noted, however, that there were no samples of the effluent taken.

The results of the recent inspection, however, were not as satisfactory. This time 24-hour composite samplers were set up to monitor the effluent from the sewage treatment plant and the chemical treatment plant. A total of seven violations of the Naval Station's NPDES permit were found.* Later on a review of the discharge monitoring reports (DMR's) submitted by the Naval Torpedo Station showed that 47 violations of permit effluent limitations had occurred since issuance of the permit. Again it must be noted that the EPA was aware of these NPDES effluent violations reported on the DMR's, but no formal action had been initiated by the EPA.

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*See Appendix A.

These results were released to the press and the first major story was published by the Seattle Post-Intelligencer on September 24, 1975. A similar story was published by the Seattle Times with the headline "Navy Station charged by EPA".[2] A followup story by the Seattle Post-Intelligencer on September 30, 1975 had the headline "47 Navy Violations at Liberty Bay-EPA".[3]

Because of these findings, a meeting was held between the EPA and the staff of the Naval Station at Keyport, Washington. The situation was discussed along with the actions to be taken in the future.

A followup letter was sent by the EPA to the Commanding Officer of the Naval Station on October 2, 1975 requesting copies of certain logs that documentated violations of the NPDES permit be forwarded to the EPA. A response was sent to the EPA on October 15, 1975 in which the Navy stated what actions had been accomplished to date in order to correct the deficiencies reported by the inspection and what actions would be taken in the future.

All previous discussions between the EPA and the Navy up to November 1, 1975 had been concerning the reported

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[2]The Seattle Times, September 24, 1975, p. B6, col. 1.

[3]The Seattle Post-Intelligencer, September 30, 1975, p. A4, col. 1.

violations, but no actual chemical analyses had been available because of the length of the tests involved. On this date a letter was sent to the Navy with the results of the chemical analyses.

Along with the results, a request for another meeting was made. It was stated that the situation was to be discussed and that the formulation of a formal compliance agreement between the Navy and the Environmental Protection Agency would be approached. The compliance agreement would address definite steps to be taken in the future to assure compliance with the terms of the Naval Station's NPDES permit.

This important meeting was held on November 6, 1975 at which time the Navy was given a draft of the Compliance Agreement. The Agreement stated that the Navy was to immediately comply with the terms and conditions of its NPDES wastewater discharge permit and construct facilities at the Naval Torpedo Station to improve the electroplating plant operation, upgrade the chemical pre-treatment facilities, add an additional secondary clarifier at the station's sewage treatment plant and eliminate the station's storm sewer discharges to Liberty Bay. All of these improvements were to be accomplished according to an established schedule.

The Navy informed the EPA that there were no guidelines or procedures in existence for the Navy to enter into such an agreement with the EPA and that no one at the Naval Station could sign the agreement.

Based upon this, the EPA contacted the Office of Federal Affairs for guidance and help in this situation. On January 2, 1976 the Office of Federal Affairs after talking with officials at the Department of the Navy in Washington, D.C. proposed that a Memoranda of Understanding be prepared because the execution of a compliance agreement was not the proper procedure to be followed in this case. The Memorandum of Understanding would contain the needed actions to be taken to correct the deficiencies and provide a schedule of compliance.

Following the suggestion, the EPA drafted a Memorandum of Understanding and presented it to the Navy on February 12, 1976. The Navy responded to this proposal on March 24th. Again the Navy stated that there was no one who could take the responsibility of signing the memorandum and requested that their response in the letter be accepted in lieu of the memorandum.

This in essence is where the problem lies today for there never has been any official compliance agreement or a memorandum of understanding signed by any member of the Navy. The proposed guidelines that the Environmental Protection Agency had written to cover such a situation were followed and found to be inadequate.

The following chapter will be an attempt to analyze why the guidelines failed and why the two agencies could not come to terms and deal with each other. It is hoped that all contributing factors will be placed into their prospective places.

CHAPTER 3

ANALYSES

As has been stated previously, the guidelines that the U.S. Environmental Protection Agency had formulated to deal with federal facilities which were not in compliance with their NPDES permit failed to provide adequate guidance in the confrontation between the EPA and the Naval Torpedo Station, Keyport, Washington. Why the guidelines failed and an analysis of that failure will be the subject of this chapter.

The concept of conflict has been treated as a general social phenomenon, with implications for the understanding of conflict with and between organizations.[4] However, conflict can be more readily understood if it is considered a dynamic process. A conflict relationship between two or more organizations can be analyzed as a sequence of conflict episodes. Each episode exhibits a sequence or pattern of development, and the conflict relationship can be characterized by stable patterns that appear across the sequence

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[4]Jessie,Bernard, T. H. Pear, Raymond Aron, and Robert C. Angell, The Nature of Conflict (Paris: UNESCO, 1957); Kenneth Boulding, Conflict and Defense (New York: Harper, 1962); Lewis Coser, The Functions of Social Conflict (Glencoe, Ill.: Free Press, 1956).

of episodes.[5] This pattern of episodes can be likened to Downs' "issue-attention cycle" concerning the public's interest in news worthy items.[6]

The parties to the relationship may not be aware of any basis for the conflict until the conflict happens, but these "behind the scenes" feelings and extenuating circumstances play an important role in the conflict.

When environmental laws and standards were first passed in 1970, governmental agencies thought themselves to be exempt, in that the laws applied to everyone else but themselves. This was evident with the passing of the National Environmental Policy Act of 1970 and the advent of environmental impact statements.

Coupled with this feeling of exemption, is the military's goal of national defense. That is, that at times environmental matters are of minor concern when it is felt that national defense and security are at stake.

Another important aspect that must be considered is the fact that the military has always had to report to civilian authorities. Up to within the last 30 years much of the civilian control has been oriented toward questions

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[5]Louis R. Pondy, "Organizational Conflict: Concepts and Models", Administrative Science Quarterly, Vol. 12, No. 2, Sept. 1967, pp. 296-320.

[6]Anthony Downs, "Up and Down with Ecology—the issue-attention cycle", Public Interest, No. 28, Summer 1972, pp. 38-50.

of administrative structure, rather than performance or policy.[7] But there has been increasing civilian pressure to enter into these other areas. The Vietnam War is one such intervention. Because of this increasing pressure, the military has developed a great sensitivity towards increased civilian control. Under these circumstances, it was almost inevitable that tension would be created and maintained between civilian and military personnel.[8]

This increasing aspect of civilian control was felt with the issuance of Executive Order 11752 requiring all federal facilities to conform to applicable air, water and noise standards established by federal, state and local authorities and the monitoring of those standards by the U.S. Environmental Protection Agency.

Another area which must be investigated is the way in which policy decisions are made by each participant. This is what might be called the bureaucratic policy system and has traditionally been designed in terms of two criteria. The first criterion is the responsiveness of the system—the extent to which it promotes a correspondence between the decisions of bureaucrats and the preferences of the

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[7]Paul Y. Hammond, "Effects of Structure on Policy", Public Administration Review, 1958, Vol. 18, p. 179.

[8]Morris Janowitz, The Professional Soldier, New York: The Free Press, 1971; Samuel P. Huntington, The Soldier and the State, New York: Vintage Books, 1957.

community. The second is the effectiveness of the system—the degree to which it leads to decisions which are more likely than alternative choices to bring about the outcomes that are desired.[9] Responsiveness and effectiveness are thus the touchstones by which one commonly measures the utility of a bureaucratic policy system.

At all levels of government in the United States, the task of creating an acceptable policy system has been enormously complicated by the fact that the criterion of responsiveness and effectiveness often point in opposite directions. Organizational arrangements and procedures that appear perfectly designed to enhance the responsiveness of the bureaucratic policy system frequently seem least likely to produce effective results.[10]

In national security administration, for example, the effectiveness of any undertaking has usually seemed to demand a high degree of secrecy in bureaucratic deliberations. Because of this, the Navy is not in the habit of publicizing their every move in order to fulfill the responsive aspect. That is to say that the Navy is not geared to be responsive, but rather, it is judged almost wholly upon how effectively it carries out its assigned tasks.

This, however, is not the case when one applies responsiveness and effectiveness to the EPA. Since it is a young

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[9] Francis E. Rourke, Bureaucracy, Politics, and Public Policy, Boston: Little, Brown and Co., 1969.

[10] Ibid.

agency, it is trying to build a good reputation in representing the country's best interest. Because of this the EPA possesses a desire to publicize its actions.

It is clear that there are a good many situations in which disclosure contributes to the effectiveness as well as the responsiveness of the organization. Unfortunately, in trying to be responsive in their actions with the Navy, the EPA was not effective in solving the problem. In fact, the EPA's desire to publicize their actions led to the first conflictive episode with the Navy.

The problem that Sea Farms, Inc. was having with high mortality rates was published by The Seattle Times on September 16, 1975 and by the Kitsap County Herald on September 17, 1975. In both stories Sea Farms, Inc. stated that they thought the Keyport Naval Torpedo Station was the cause of the deaths.[11]

On September 24th both the Seattle Times and the Seattle Post-Intelligencer published stories emphasizing the results of the three-day compliance inspection at the Keyport Naval Torpedo Station.[12] These results were obtained from the EPA before the Navy was made aware of them. In fact the Navy became aware of the results when reporters from the respective newspapers confronted the Naval Station's

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[11] The Seattle Times, Sept. 16, 1975, page 1; The Kitsap County Herald, Sept. 17, 1975, page 1.

[12] The Seattle Times, Sept. 24, 1975, page B6; The Seattle Post-Intelligencer, Sept. 24, 1975, page A3.

Commanding Officer asking for comments.

To say that the Navy was placed in an embarrassing situation is deemphasizing the impact of this event. In a letter to the EPA's Regional Administrator, the Commandant of the Thirteenth Naval District made it clear that the Navy felt as though it had been betrayed because the results were to be discussed with the Navy before being released.[13]

This was the beginning of what the Navy felt was bad publicity where the Navy became the central theme and the public's whipping boy. The Navy felt it had cooperated in the matter only to have its cooperation thrown back at them on the front pages of the newspapers.[14]

To rub salt into the wound, the Washington State Department of Ecology on October 27, 1975 fined the Commandant of the Thirteenth Naval District one thousand dollars for violations of the NPDES permit at Keyport, Washington.

It made little difference to the Navy when the EPA explained that the results of the compliance inspection had been "leaked" to the press by someone in EPA's office.

All of this combined to place the Navy on the defensive in the matter and the lack of trust seriously

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[13]Department of the Navy, Commandant Thirteenth Naval District ltr. 11300/1, Ser. N441/125 dtd. 25 Sept. 75.

[14]Personal interview with the Executive Officer, U.S. Naval Torpedo Station, 14 June 1976.

constrained any future relationships between the two.

Throughout the entire incident, the EPA had been working under a handicap. It was not until recently that the EPA has concentrated any effort in the area of federal facility non-compliance. All effort has been focused on non-federal polluters.

This concerted effort gave them a wealth of knowledge and experience in the avenues of handling non-federal violators, but almost no experience in handling federal violators. The guidelines that had been established for such a situation were no help at all.

The guidelines stated that the EPA Regional Offices were to do everything possible at their level to resolve the conflict. If that proved unsuccessful, then the matter was to be forwarded to the EPA Headquarters, both to the Office of Federal Activities and to the appropriate headquarters enforcement office.[15] The guidelines did not specify what procedures were to be followed or what was to be done at the local level to resolve the matter.

The Navy was not in any better shape for they possessed no guidelines nor did they have any experience in such a situation.

The EPA tried to solve the matter as though the U.S. Navy was a non-federal activity. As has been stated they tried to issue a Compliance Order and when this failed,

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[15]U.S. Environmental Protection Agency memorandum dtd. November 20, 1973.

they tried to use a Memorandum of Understanding. This also failed.

The reason that these two methods failed is simply that the Navy could not work with the two approaches taken by the EPA. Why the Navy was unable to accept these avenues of enforcing compliance is based upon their patterns for handling situations. This set up the most important conflictive episode.

The manner in which an organization handles crises has been evolved through a trial and error process.[16] The outcome of this process sets a pattern for handling crises in the future.

Once the patterns have been established, it is unlikely that they will be changed in the future. The U.S. Navy has established its own pattern for handling situations based upon two hundred years of tradition and experience.

What the EPA was requesting of the Navy, was impossible for them to do. The EPA wanted the Commanding Officer, Naval Torpedo Station to sign the Compliance Order which then would bind the Navy to a course of action that had to be accomplished in a certain period of time. This required money which was in excess of his local authority to spend.

The Commanding Officer did not possess the authority to bind the Navy to a contract such as the EPA desired.

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[16]James S. Coleman, Community Conflict, Illinois: The Free Press, 1957.

Furthermore, it would be impractical for the Commanding Officer to sign such an agreement realizing that the stipulations of the contract were beyond his authority and responsibility.

As an example, both the Compliance Order and the Memorandum of Understanding called for certain construction to be accomplished. If the cost of the proposed construction was above what the Commanding Officer could authorize, then it would be necessary for him to request from his superior the amount of money needed. If for some reason his superior did not have the money or it was also in excess of his authority, then the Commanding Officer would have to submit a construction proposal.

This contruction proposal would then proceed up the chain of command and if priorities within the Navy allowed, it would be submitted to Congress for approval. This entire process could very easily take several years before the money was granted and appropriated.

Here again, the Commanding Officer has no control over the process at all. Once he makes the recommendation for the construction, his responsibility ends and cannot again proceed until the money is appropriated.

In summary, it can be said that the matter remains unresolved because a procedure to overcome these problems has not been presented to both parties. Also, because of the feelings over increased civilian control, adverse

publicity, lack of trust, inadequate guidelines and a feeling of exemption led to the failure of the proposed solution.

Just what would succeed and be acceptable to both the Navy and the EPA will be covered in the next chapter.

CHAPTER 4

A PROPOSED SOLUTION

It must be realized that all of the factors which contributed to the failure discussed in the previous chapters cannot be solved with one simple solution. In fact, no matter what type of solution is proposed, certain hazards will exist that could cause another breakdown in communications.

The military's sensitivity towards increased civilian control is not going to dissipate. It will probably increase in intensity if the present social and political trends continue. The prospect of adverse publicity will always loom no matter what type of solution is proposed. The feeling of governmental exemption seems to be waning and it is felt that it will be less of a problem in the future.

This leaves the most important area in which changes will have the most effect—the area of handling non-compliance by federal facilities. Certain basic premises must be accepted before the solution to the problem can be presented.

The first is that the EPA must recognize that federal facilities cannot be treated as though they were non-federal activities. This is not saying that federal facilities should have separate standards. On the contrary, the same standards should apply to all. However, when a federal

facility is found to be in violation, a separate procedural process should be instituted.

The threat of court action and fines is hollow because there is little or no chance of it happening. The government cannot sue the government. The question has probably arisen as to what type of threat will be effective in promising compliance. Actually no threat of any kind can guarantee 100 per cent compliance all the time.

What needs to be considered is the course of action that will be effective when applied, in this case; to the U.S. Navy. If the course of action can take advantage of the military system and the manner in which it works and still keep in mind the constraints under which it must work, then the solution should be effective.

The U.S. Navy is built around a structure called the chain of command. That is, everyone has his responsibilities and authority and reports to the next highest level in the chain of command. It is the pyramid effect.

One function of a superior is to make out an evaluation on those subordinates that report to him. This fitness report evaluates the person's performance in his work, carrying out his responsibilities and overall contribution to the Navy.

The fitness report is extremely important for it is used to determine promotions, pay increases, and the person's career pattern. If a person receives a bad fitness report, it could very well mean that his career in the Navy is

over. Therefore, anything which could threaten a man's fitness report with derogatory comments because he failed to do his job would be an effective measure of insuring that the job would be carried out and completed.

Keeping the military's dependence upon the chain of command and their use of fitness reports for evaluations in mind and not losing sight of the fact that each man's authority is limited and that the use of the chain of command can be very time consuming, a solution can be evolved based upon these facts.

The procedural process that is being suggested will be new to the EPA, but not to the military. Why the EPA is asked to institute a new process rather than the Navy is because the EPA is more flexible and capable of change than is the Navy. The EPA is a younger agency and has had less time to establish permanent patterns of operation.

The new process involves formal inspection procedures. The military is accustomed to inspections for it is a way of life. These procedures are concerned with the manner in which the results of the inspection are handled.

As an example, we will use the results of the 15-18 September 75 compliance monitoring inspection as a test study. It was determined by the EPA that the Naval Torpedo Station, Keyport was in violation of their NPDES permit on 7 different occasions, and that there were 47 violations reported on the Discharge Monitoring Reports.

Once this determination is made, the EPA will present

the findings to the Commanding Officer of the Naval Station and ask for his comments. The comments desired are ones where he either agrees with the findings or if he disagrees, why he does so. By allowing the Navy to comment, it may clear up some gray areas and may reduce the number of violations.

For instance if one of the permit standards is violated, it must be reported in writing within 5 days from the date that the violation was determined. If it is not reported then this also becomes a violation. Some of the 47 violations found by reviewing the DMR's were for not reporting, but if there had been a commentary period, the Navy could have shown they did send a letter in some cases. This would have reduced the number of violations.

After the Commanding Officer has submitted his comments and a final determination has been made as to the violations, if any, the Commanding Officer will submit his plans for correcting the deficiencies. This will tell the EPA what will be done in the future.

Once all correspondence has been gathered by the EPA, then a final inspection report will be published. The report will include, the results of the inspection, any violations, the Commanding Officer's comments concerning these violations and his plan to correct the deficiencies. The original will be sent to the Commanding Officer, and copies sent to his superior and the appropriate people in the Department of Defense and the EPA.

This completes the procedure. If it was determined that in order to correct the deficiencies, a large sum of money was needed, in excess of the Commanding Officer's authority, then the EPA could contact EPA Headquarters who in turn could contact the Department of Defense and possibly help in getting the money appropriated while the Commanding Officer went through his chain of command.

This now places both parties on the same side rather than being antagonists. They would work together.

If in the future, the Naval Station was again inspected and it was found that none of the deficiencies were corrected nor any action was taken, then the EPA would contact the Commanding Officer's superior and request that he investigate the situation. This would be a formal request with copies sent to the appropriate people in each man's chain of command. This type of pressure will be just as effective as the threat of court action and fines is to non-federal activities.

If one involves enough people in the chain of command, then the problem will be solved. However, it is felt that there will be few occasions where a man's superior will have to be contacted.

This proposed procedure will work for it allows the Navy to work within their system in a manner to which they are accustomed. The EPA will have fulfilled their responsibilities by locating violations and they will have a course of action from the violator stating how the deficiencies will be corrected.

CHAPTER 5

DISCUSSION

The question has probably arisen as to what can be expected if the actions proposed are accepted and initiated by both the EPA and the Navy. How will the environment respond? Are there any uncertainties?

It must be realized that the problem was not how to improve the environment, but rather how to get two governmental agencies to communicate so that they together can solve environmental problems. The proposed procedure is an attempt to provide a means whereby the Environmental Protection Agency and the U.S. Navy can work with each other.

The word with is very important. It implies unity rather than separateness. If someone works with another then there is a common goal and in this case the goal would be to solve environmental problems. If such is the case then the environment will benefit.

It would be incorrect to assume that there is going to be an immediate end to the discharge of all pollutants by the Navy with the advent of these administrative procedures. Two things must be kept in mind; the limited authority of the Commanding Officers and their dependence upon the chain of command for money which exceeds their authorized limits.

By no means is this a one way street. The EPA is going to find it necessary to exercise patience and understand the bureaucratic system. The Navy is subject to the same budgetary constraints and time consuming procedures as the EPA.

This is not going to immediately diminish the military's sensitivity to civilian control. It will not help the EPA's image of trying to treat everyone fairly. There will be those who will not understand why it must be done in this manner and the EPA will be accused of showing favoritism.

Confidence and trust take a great deal longer to build than to tear down. As a possible indication of what may lie ahead, it is interesting to see that when the Office of Management and Budget cuts funds for military construction which were to be used for solving environmental problems, the Navy approached the EPA to see if they could bring additional pressure to get the money reinstated. It may work.

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APPENDIX A

As a result of the September 15-19, 1975 compliance monitoring inspection of the Naval Torpedo Station, Keyport, Washington, the Environmental Protection Agency cited the Naval Station with seven violations of their NPDES permit conditions. Those violations were as follows:

	Incidents	Number of Violations
(a)	2 overflows in September from the electroplating plant which resulted in	4 (2 current unauthorized discharges and 2 failures to notify the EPA)
(b)	Paint chip discharges to Liberty Bay from storm sewer on Sept. 17, 1975	2 (1 unauthorized discharge and 1 failure to notify the EPA)
(c)	Upset conditions at the sewage treatment plant which interfered with performance	1 (failure to notify the EPA)
	Total	7

During the inspection, an overflow pipe which discharged directly to Liberty Bay via a storm sewer was discovered by EPA personnel. Occasionally discharges from this overflow line occurred when the plating plant flows exceeded the capacity of the chemical treatment plant, which is approximately 30 gpm. Through discussion with the chemical treatment plant personnel and inspection of the chemical treatment plant logs, two overflows had occurred during September. Because of these findings, the four violations were given.

The overflow pipe has been plugged so that future incidents of this nature cannot happen. However, this solution will cause future problems in the treatment process. These problems will be discussed shortly.

On September 17, 1975 EPA divers in an area north of the electroplating plant observed a discharge from a storm sewer, which appeared to be paint chips. The source of the discharge was not definitely known. This discharge lead to the two violations which were stated above.

The last violation cited was caused by a caustic spill which occurred in the electroplating plant during the evening of September 15, 1975. The spill was not adequately treated by the chemical treatment plant. This "slug dose" was passed on to the sewage treatment plant where upset conditions resulted. These upset conditions resulted in the Naval Station exceeding 10 of their 13 effluent limitations.

This last violation is particularly important since the overflow pipe mentioned above has been plugged and future overflows and spills will be passed directly on to the sewage treatment plant. Why these upset conditions occurred will be the subject of the following discussion.

The Naval Station has a small sewage treatment plant which biologically processes sanitary wastes as well as those coming from the chemical treatment plant. As mentioned, these latter wastes come from the electroplating plant and consist of aluminum, cadmium, chromium, hexavalent chromium, nickel, zinc and cyanide. Figure 1 shows a flow

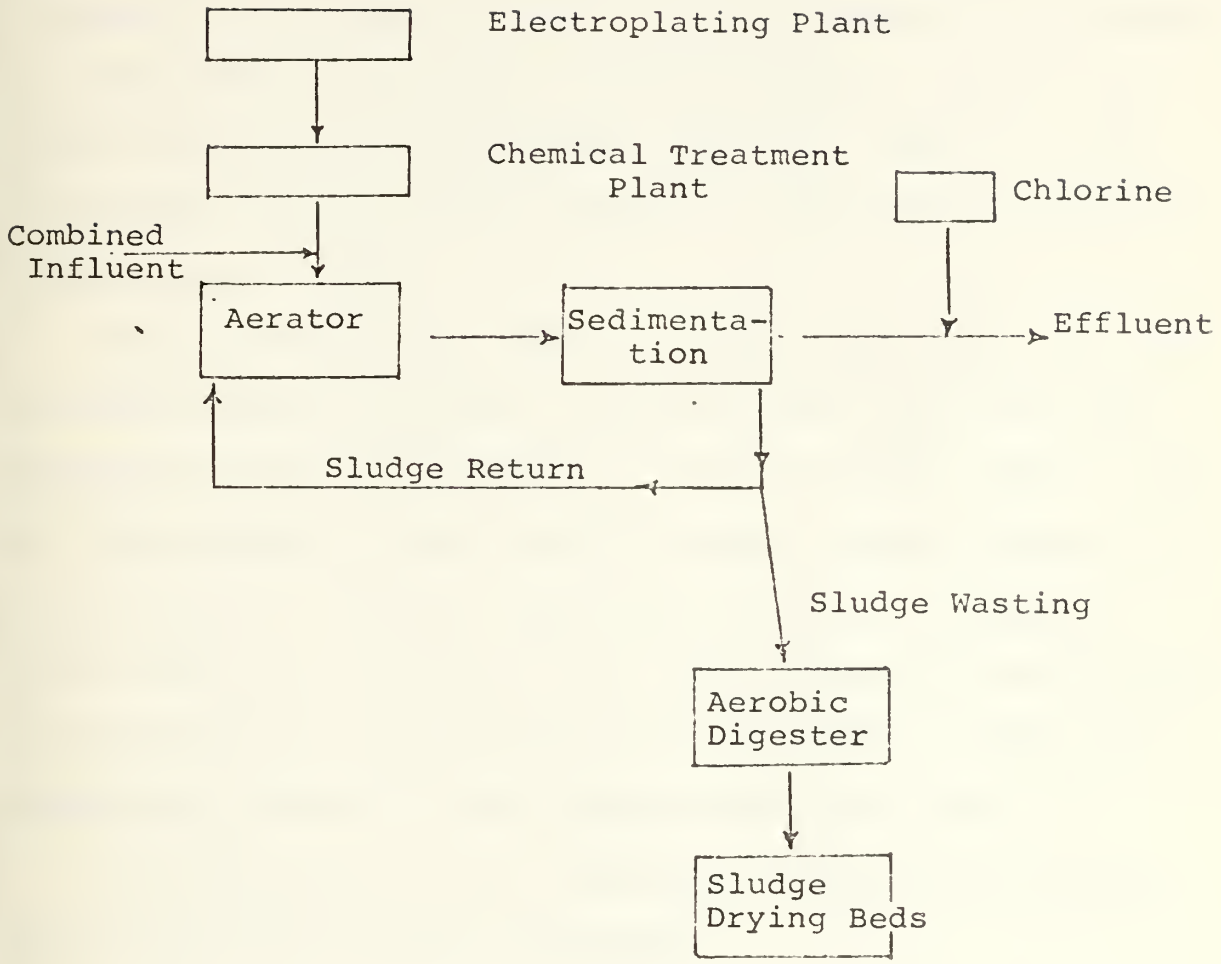

Figure 1. Process Flow Diagram at the Time of the Study

diagram of the sewage treatment plant

The Chemical treatment plant consists of a Udylite Packaged Destruction Unit to convert the hexavalent chromium to inert chromic hydroxide. The hexavalent chromium must first be converted to trivalent chromium. This is accomplished by allowing sulfur dioxide to mix with the water to form sulfurous acid.

The sulfurous acid reacts with the hexavalent chromium to form trivalent chromium. However, this must be accomplished at very low pH levels. Hence, sulfuric acid is added. The mixture of water and trivalent chromic sulfate is then released to another tank where caustic is added to raise the pH to a range of 7 to 8 and react with the sulfate to form chromic hydroxide which is discharged to the sewer system and conveyed to the sewage treatment plant.

The conversion of the hexavalent chromium can be summarized by the following reactions:

1) $SO_2 + H_2O \longrightarrow H_2SO_3$

2) $3H_2SO_3 + 2H_2CrO \longrightarrow Cr_2(SO_2)_3 + 5H_2O$

and 3) $Cr_2(SO_2)_3 + 3NaOH \longrightarrow 2Cr(OH)_3 + 3NaSO$

This is the only treatment which is performed on the wastes coming out of the electroplating plant. It can be seen that if the system fails to convert the hexavalent chromium to chromic hydroxide which is inert and can be precipitated out, then the biological system at the sewage treatment plant is in danger of being severely affected by an overdose or surge of untreated chromium.

As can be seen this overdose or surge is introduced directly into the biological reactor. This instantaneous contact coupled with the chromium's toxicity can render the sewage treatment process inoperative and the treatment of the wastes will be greatly reduced.

The effects of chromium on activated sludge systems has been investigated by numerous people (see references 4, 8, 12). It was felt that the effects resulting from continuous feeding and those resulting from slug doses should be compared to the situation at Keyport's Naval Torpedo Station, since both cases apply.

It has been found that doses of chromium alone short of massive slug doses (100 mg/l to 500 mg/l) is unlikely to harm the operation of a sound sewage treatment plant. With massive dosages, the plant recovered in a range of 20 to 48 hr, as measured by BOD removal efficiency.

Concentrations of hexavalent chromium of up to 0.5 milligram per liter were almost completely removed under conditions of the studies. At a 2.0 milligram-per-liter feed, hexavalent chromium was occasionally found in small quantities in the effluent. With the 5.0-milligram-per-liter and higher chromate feeds, variable but increasing fractions of the chromium passed through the system to emerge as either hexavalent or reduced chromium in the effluent.

The retention of chromium in the system occurred largely in the activated-sludge solids. Reduced chromium had little or no toxicity to activated sludge. The digester

operated well with as much as 3.5 per cent chromium in the solids.

Even though the system recovered, the effectiveness of the system during the upset conditions was greatly impaired. The final effluent became turbid and the amount of suspended solids contained therein increased.

This is exactly what happened to the STP at Keyport during the upset conditions experienced while the inspection was in progress. Suspended solids went to 76 mg/l, (weekly avg = 45 mg/l), BOD_5 went to 90 mg/l (weekly avg = 45 mg/l) chromium went to 1.64 lbs (daily max = 0.1 lbs) and hexavalent chromium was measured at 20 mg/l (daily max = 0).

It must be remembered that the plating wastes contain significant quantities of aluminum, nickel, zinc, cadmium and cyanide. These may enhance the toxicity of chromium.

The effects of zinc on activated sludge was investigated by McDermott, et al. (reference 10). It was found that zinc fed continuously in concentrations ranging from 2.5 to 20 mg/l of sewage reduced the BOD removal efficiency a maximum of about 2 per cent. Two forms of zinc, zinc sulfate and complexed zinc such as that which occurs in an alkaline cyanide plating bath, had about the same effects.

It was found that the microbial floc of secondary treatment absorbs much zinc. The process was from 95 to 74 per cent efficient in removing zinc at feed levels of 2.5 and 20 mg/l.

A 160 mg/l slug dose of zinc, lasting for 4 hours, caused a serious reduction in treatment efficiency for about 1 day. Forty hours after the slug, the plant recovered and produced suitable effluent.

McDermott, et al. also investigated the effects of nickel on activated sludge systems (reference 11). It was determined that nickel, fed continuously, in concentrations ranging from 2.5 to 10 mg/l in the sewage entering a complete activated-sludge pilot plant reduced the BOD removal efficiency a maximum of about 5 per cent. Increased turbidity in the final effluent was the most objectionalbe feature.

A 200 mg/l slug dose of nickel caused a serious reduction in treatment efficiency for a few hours, but the plant returned to normal performance within 40 hours.

The complete activated-sludge process was about 30 per cent efficient in removing nickel. The sulfide content of the influent sewage had no correlation with efficiency of nickel removal.

These studies were fine for showing the effects of the individual metals, but what are the effects when the metals are combined as in the case with the Keyport Naval Torpedo Station. Barth, et al. look at these considerations (reference 1).

The combination of four metals, zinc, nickel, copper and chromium, with a total concentration of 8.9 mg/l, had no great effect on the overall efficiency of the pilot-

scale activated-sludge plant. No synergistic action was noted. Approximately 50 per cent of the zinc, 54 per cent of the copper, 37 per cent of the chromium and 31 per cent of the nickel were removed from the influent sewage. The metals, in combination, behaved independently in their distribution throughout the process.

As in the individual experiments, nitrification was almost completely inhibited. This is significant because the final effluent could contain excessive ammonia. A high ammonia content can be a potential toxicant to fish in the receiving water, create a high chlorine demand if break-point chlorination processes are employed, and possibly cause a large oxygen usage because of stream nitrification after dilution.

With the exception of zinc, the metals passing through the activated-sludge and discharged with the final effluent are predominantly in a soluble form.

One may say that pilot plant studies are fine, but there is always the question of correlation to real plant situations. English, et al. (reference 5) showed that there was no significant adverse effects when a slug dose of chromium, concentration as high as 500 mg/l, went through the Bryan, Ohio municipal sewage treatment plant.

A survey of four municipal treatment plants, concerning the receipt of heavy metals, has shown satisfactory correlation with the pilot-plant investigations.

As can be seen, a biological waste treatment plant is capable of handling heavy metals as long as the doses are not of extremely high concentrations. Granted upset conditions do arise when these large doses hit the plant, but the plant will normally recover within 48 hours.

Figure 1 points out graphically that there are no provisions to minimize the effects of a slug dose. Realizing this, the Navy contracted to have the treatment plant upgraded and have the storm drainage system separated from the sewer system.

The treatment plant received another secondary clarifier and a flow equalizing tank. See Figure 2. The flow equalizer allows for the dilution of any slug dose before its introduction into the aerator. It will also provide an additional capacity to take any surges or spills. The additional clarifier will provide a clearer effluent because the plant has experienced a problem with suspended solids.

A review of the Discharge Monitoring Reports submitted by the Naval Station indicates 12 violations of exceeding the suspended solids standards. Also there has been 9 violations concerning the fecal coliform standards. It is felt that the flow equalizer will minimize the effect of any upset conditions and thereby help the removal efficiency of BOD.

One concern that I have is the lack of treatment for the cyanide. In review of the DMR's, it was noted that there were 7 violations of the standards for discharge of

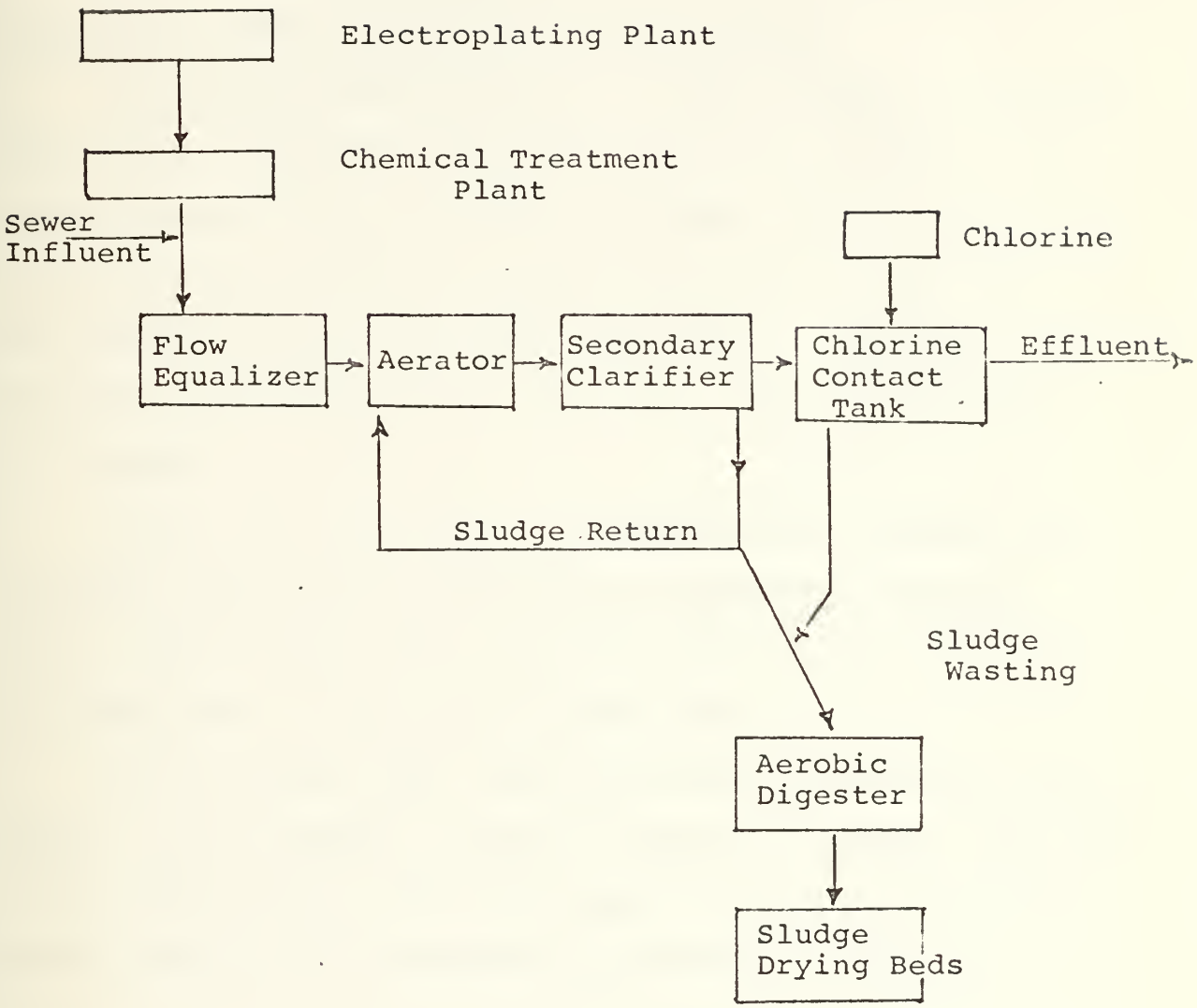

Figure 2. Present Process Flow

cyanide. It need not be emphasized as to the importance of controlling the discharge of cyanide. I have been informed that a system similar to the one for treating hexavalent chromium is being installed to convert the cyanide to carbon dioxide and nitrogen gases.

To test the effectiveness of these changes, I reviewed the latest compliance monitoring inspection report. The Naval Station was inspected in November, 1976. The results show that the suspended solids concentration was 2 mg/l at the maximum for the three day inspection. This was a significant improvement from a year ago. BOD_5 had a maximum of 19 mg/l.

It was noted too that the Naval Station exceeded the effluent standards for cyanide and hexavalent chromium again, but in both cases the values were 2.5 per cent and .035 per cent of the values a year ago.

It is apparent that there have been significant improvements in the treatment system at Keyport. However, the Navy is not stopping for they have plans to improve the plating plant operation if the money is approved by Congress.

Thesis
M83945 Morrow
Federal facility
non compliance with
national pollutant
discharge elimination
system permits.